

Unmanned Aerial Vehicles (UAVs) for Radiological Monitoring Analysis
Decision Paper for the State Coordinator, Michael Cline
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Background. In October, 2011, an initial meeting was held to discuss a verbal proposal from the City of Newport News Emergency Management Coordinator proposing developing a State UAV-based radiological monitoring program. Ostensibly, this approach would minimize the risk to local firefighters and others who might be tasked to conduct radiological detection and monitoring in the event of a radiological release at a nuclear facility. The release in Fukushima, Japan was used as a scenario example. Present at this meeting were local officials, representatives from the FAA, Dominion Power and members of VDEM's Preparedness, Technological Hazards and Operations Divisions. VDEM continues to await a formal, written proposal, but we have, in concert with the Virginia Department of Health and Department of Military Affairs, conducted research into the matter.

Analysis of Alternatives. The Nuclear/Radiological Annex of the National Response Framework (NRF) clearly defines the Federal role in radiological incidents. Policies cited in this document include, but are not limited to the following:

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Per the NRF, CERCLA grants Federal On-Scene Coordinators (OSCs) the authority to direct the response to ensure the "protection of public health and the environment". Among the OSCs' response actions listed in CERCLA are air monitoring and assessment of the extent of contamination.
- Atomic Energy Act (AEA) of 1954 (as amended). According to the NRF, The AEA Charges the EPA with "additional responsibilities regarding radiation matters that directly or indirectly affect public health".

Federal capabilities mentioned in the NRF in support of those agencies listed as "coordinating agencies" include:

- Federal Radiological Monitoring and Assessment Center (FRMAC). Led by DOE, FRMAC is an interagency asset that responds to nuclear/radiological incidents and coordinates Federal environmental and agricultural monitoring and assessment activities for the initial phase of the response.
- DOE Aerial Measuring System (AMS). The DOE AMS characterizes ground-deposited radiation from aerial platforms, both fixed and rotary wing, using onboard radiological measuring equipment. This asset provides computer analysis of aerial measurements conducts aerial surveys and can map large areas of contamination. DOE AMS aircraft are based at Andrews AFB, 72 miles from North Anna and 114 miles from Surry.

The NRF delineates nine additional Federal deployable assets that support nuclear/radiological incidents, which are omitted for the sake of brevity.

Concerns Inherent in Developing a State-level, UAV-based Radiological Monitoring Program:

- a. Inventory. Although the Commonwealth's Department of Military Affairs has UAVs in their inventory, these airframes are designed to perform surveillance and reconnaissance and cannot be re-configured for aerial radiological monitoring missions. Therefore, the Commonwealth would be required to obtain airframes to perform the mission and ensure trained and certified operators. Based on our research, leasing this capability from the private sector is currently not a viable option.
- b. Potential redundancy/overlap with Federal capabilities. As noted in the NRF, the Federal Government has robust radiological monitoring/incident management capabilities and they have the statutory authority, the trained manpower and the budget to employ these capabilities to great

effect. A State-level program would require manpower, training and sustainment costs that would essentially re-create established federal capabilities.

- c. Lack of an established Concept of Operations. The UAV approach was nominated to reduce the risk to personnel, both ground-based and members of aircrew. However, the potential complications in the process of recovery/decontamination/disposal of a contaminated UAV would threaten to aggravate, rather than alleviate the consequences of a release. While the UAV approach might reduce some risk to first responders tasked with radiological detection and monitoring, the prospect of having unmanned aircraft, contaminated with radiation flying above our communities presents a potential risk to public safety and the environment that is disproportionate to any intended benefit. Furthermore, airspace management procedures, strictly under the purview of the Federal Government, would require an extraordinary level of coordination which would threaten to add layers of complexity to an already chaotic situation.

Recommendation: Based upon the foregoing, our working group recommends against the development of a State-level UAV program for the following reasons:

- a. Agencies within the Federal Government already have the mission, expertise and the equipment to fulfill the requirement. A duplicate State-level UAV program would entail enormous cost and complexity, and would, in the end, yield a system inferior to established, proven Federal capabilities.
- b. The development of the UAV and sensor system, expensive and complex as this project would be, constitutes only one component of an “airborne radiation detection and monitoring system”. Not considered here are the processes to collect and analyze data, the means by which data are shared with Federal entities and a host of other issues inherent in the creation of a redundant and duplicative system. _